Yi 2
7397
F 20

Lecture on
Criminal Law.

Exactly the same process Dr Black has supposed takes place in the production of Animal ~~life~~ heat. We all carry a fire place about with us. & the Chimney which contains it is seated the Dr. supposes in the lungs. The facts which support this Opinion are as follow.

1 the Absolute necessity of Air to ~~the~~ Animal life. There is no animal in the world that ~~lives~~ without it, whether it exist in the Air - in the water, under the earth, or upon the face of the earth. Birds breathe, and least they should suffer from an inability to perform that function in their rapid flight thro the Air, they are provided with Cells which serve as reservoirs of

Air, and which probably afford them
the Oxygen which supports their heat.
Even the bones of birds contain air
and probably for the purpose that has
been mentioned.

Fishes respire Air with Water by.
Organs of their Gills. They sicken
& die when deprived of it. Their Air
bladder may probably supply for a
while the want of external Air, al=
=though the principal design of it is
to assist them in ascending & descending
in the Water.

Insects which are destitute of lungs

and Gills do not live without Air.
- It is conveyed to them by means of
long tubes called Trachia or Stigmata
extending from different parts of the
body. In some insects these tubes arise
from the posterior - in others from
the back and sides. If these tubes be
stopped by means of Oil, the insect
dies from Suffocation - that is from
the want of Air.

Worms likewise exist only in con-
=sequence of their Communication with
the Air.

Snails die without Air. When
they retreat from the Cold of Winter,

~~which~~

which dilatations & contractions
may be distinctly seen, and to this
tube the Air has recess. Cuvier
speaking of this ~~mode of~~ excretions
Countenance says "the blood not being
able to go in search of Air, the Air
goes in search of the blood". —

The heat in all these classes of
animals is different. In fish it is but
2°. above the temperature of the water
in which they swim. The heat
generated is generally in proportion

they cover their bodies with a slimy coat
to them as to admit the passage of air
through it. If this coat by any accident
become too thick to admit the air,
they perforate it in order to make a
passage for it.

The Toad which has been found
in the middle of the trunks of large
trees, and in the centre of stones where
it has existed for one or two Centuries
it is generally supposed, receives air
in to preserve its heat this the pores
of the trees, and the crevices of the stone.
Lastly - even these Insects which
are destitute of lungs have a membranous
tube running along their backs in V

to the Size of their lungs, and the
Quantity of Air consumed in them.

The Connection of the heat of the body with the admission
2 of Air into the lungs has been inferred from the quantity of
Air consumed in respiration, said to be
a Gallon in a minute - that is 14 cubic
inches according to Dr Goodwin in each ex-
-spiration, but according to Dr Jurin, & Dr
Menzies experiments 40 cubic inches,
in a minute
~~Dr Menzies~~ in a heat of 60°. It is said to
expand to 43 cubic inches in the lungs.
The Connection of the heat of the body with the admission
3 of air into the lungs has been admitted
from Animal heat being in propor-
-tion to the Quantity of Air consumed in
respiration, and to the relative scope of the
~~Size~~ of the lungs,
~~Capacities~~ to the Size of Animals. It is
111: ~~Another~~ in birds, and they we know
have larger lungs in proportion to their
Size than any other Animal. ~~It~~
Animal heat is in a lower degree in fish,
insects, & reptiles than in Man, and

many other breathing Animals, and they
we know have very small lungs in pro-
-portion to their size, and consume but
little Air in respiration. It is in a very
low Degree in the toad for which reason
Mr Swift informs us in his travels into
Spain, that the Spanish ladies sometimes
toads in their bosoms in Order to support the
heat of their bodies in hot weather.

4 — From the Change which is produced in
the Air which is discharged from the lungs
in expiration being exactly the same as
that which is produced in the Air after it
is robbed of its Caloric or matter of heat
by the Combustion of a piece of wood, or
any other body. The Air we respire
is true Azote - or phlogisticated Air &

not only extinguishes flame, but is fatal
to Animals that breath it.

5 From the Aratic Air which is dis=
=charged from the lungs being less known
according to Dr Crawford than pure Air which is
taken into the lungs.

6 From the Arterial blood or which the Ox=
=ygen Air first acts, being warmer
by one Degree & 1/2 according to Dr Crawford
than Venous blood. It is as 110 & 1/2 to 100.
According to Mr Hunters Anatomical
Thermometer it was 99 in the right Ventricle
& 99 in the left Ventricle of a Dog, hung
for the purpose of ascertaining this
fact by Mr Coleman.

7 From the red color of the blood.

~~is to the body after the Oxygen of the~~

This

Teachers

Color we know is derived from Oxygen
in the Colcothar of Vitriol, in red Lead, &
in Horns preserved with Salt petre, wch
Salt abounds with Oxygen. Now the
red Color of the blood is supposed to
be derived in like manner from the
Action of the Air upon it in the lungs.
It is certainly much redder in the
pulmonary Vein than in the pulmo=
=nary Artery after the Air has acted upon
it, and much redder in an Adult
than in a Foetus which has never breath=
=ed.

& From the analogous Effects of Oxygen
Air upon a burning body, and upon the
lungs. The use of this Air that can

be applied to a burning body, the more vivid is the flame emitted by it, and the greater is its heat. In like manner, the more of this Air that is received into the lungs, the greater the generation of heat — and hence — the increased heat of the body in a fever & after exercise.

---

9 In [illegible] former of the cause of animal heat which has been delivered, an attempt has been made to explain that passage in the book of Job in which he describes the Art of Respiration in the Leviathan" By his sneezings a light doth shine, and his eyes are like the eye lids of the morning. Out of his mouth go burning lamps, & sparks of fire leap out. Out of his

nostrils goeth smoke, as out of a
seething pot, or Chaldron. His breath
kindleth Coals, and a flame goeth out
of his mouth". ~~From this history of~~
The matter discharged from the nostrils
& lungs of the Leviathan ~~it is said~~ in
a State of inflammation, it has been
said is produced by the decomposition of
~~the~~ such as goes forward in a
~~ordinary~~ fire. —

Simple and beautiful as this theory ~~is~~
appears to be, there are several solid objections
to its being the sole, or exclusive Cause of
Animal heat. I shall briefly mention these
Objections.

1 The heat of the body has been observed to
be the same, when the admission of air

V "Medicin legale" mentions a case in
which the heat of the body continued
four days after death had taken place.

into the lungs has been prevented by disease
or by apparent death. A case of the latter
kind is mentioned by Dr Hass. A ~~similar~~
case occurred in Philad[a] on July 5. 1811. in
a man ~~who~~ in whom there was a total
extinction of ~~life~~ life from drinking cold
water when he was very warm. The ~~whole~~
head - hands & trunk were enormously
but four hours after his respiration was
destroyed by death. Dr Lodore in his V
2 The Use of a limb is sometimes ex=
=cised After the Operation for ~~the~~
Aneurism, whereby the passage of the blood
which has been supposed to convey the heat genera=
=ted in the lungs, to every part of the body,
~~his~~ is completely obstructed. I witnessed a
remarkable case of this kind in Jn: Hosey, from 1811 in

a patient ~~of~~ of Dr Physick. The heat was much greater in the limb on which the operation had been performed, than in its fellow; & it was so long before it was possible for the Anastomosing Vessels to supply the function of the large Artery that had been recently tied up and divided, and that had just before conveyed a stream of blood to the limb. I ask from whence in this case did the limb receive its extra quantity of heat? —

3 The heat of the body is often independant of the frequency of the pulse, or the force, or quantity of the blood propelled into every part of it. I observed the skin to be very hot when the pulse is at 40, and I think the

the hottest skin I ever felt was ~~to~~ in a Sailor in a Yellow fever in whom the pulse was imperceptible in both his wrists. & the heat of the body is diminished in old Age, and yet Old people inhale, and consume as much Air as they did in early, or Middle life.

57 There is sometimes a stoppage of respira=
=tion without any diminution of heat. Thus we see Children hold their breath in crying, and yet the heat of their bodies continues the same. The loss it is said in a race of 100 yards holds his breath, & yet the heat of his body ~~is~~ so far from being lessned, is greatly increased. The pants ~~only~~ ^ its is said at the end of the race, — and never in his course. —

6 There is often a partial & morbid sensation of heat in the extremities while the parts between them, and the lungs are cool, or cold. This could not be the case if the lungs were the only and exclusive source of the heat of the body.

7 The heat of the body is but one degree greater in the lungs, than in parts remote from them. Now were the lungs the fire place in which the heat of the body was exclusively generated, it ought to be more than one degree greater than in the extremities.

8 Certain Aliments and Drinks encrease the heat of the body, without acting in the smallest degree upon respiration, or encreasing the decomposition of Air in the

lungs.

9 Certain Sounds increase the heat of the body. This has often been experienced after the firing of Cannon. ^ Even in this case, no additional decomposition of Air takes place in the lungs for there is no increase of re=spiration.

10 Light increases the heat of the body. This is often experienced in a hot evening in Summer when Candles are suddenly brot into a Dark room. No one can suppose in this case more Air to be taken into the lungs, or a sudden decompo=sition of ~~Air~~ an increased quantity of Air to have taken place in them.

11 and lastly Certain passions increase the heat of the body without the least influence upon respiration, or the decomposition of Air in

the lungs.

I have Attempted year After year to explain these facts so as to reconcile them to the theory of my illustrious master Dr Black, but I have never been fully satisfied with my Solutions of them. I am compelled therefore to reject the Decomposition of air in the lungs as the exclusive cause of Animal heat, and to call in an additional Cause for that purpose, which I shall now Submit to your examination. I shall begin by delivering a few general propositions.

1 All bodies contain a certain portion of Caloric or the matter of heat in them.

2 These bodies are so Constituted as to emit heat from impressions made upon

occurs likewise

V It ~~therefore~~ in wood, the protracted friction upon which, not only elicits heat, but induces flame. It is thus the Indians in this Country kindle their fires. —

them by means of friction & percussion.
This is Obvious in a piece of Cold iron under
the Stroke of a hammer. It takes place
from impressions made even upon Air,
and that to such a degree in an instru-
=ment called the "pneumatic briquet" as
to induce Combustion in a Substance known
by the name of punk.

3 Different Substances posess a different
Susceptibility to impressions so that heat
is elicited from them by the greater or
lss force, and the heat is increased
according to this the greater or lss duration
of those impressions. These facts being
admitted I proceed to apply them by
remarking
4 That Inanimated matter in Common

with the Substances that have been
mentioned, Contains a quantity of
Caloric, or matter of heat in it, which
it emits in Common with these Sub-
=stances in Consequence of impulsions
made upon the body, and thus produces
the Sensation and other phenomena
of Animal heat. In addition to the
facts that have been mentioned of
the production of heat from chemical
Sounds, light and the action of the
passions upon the body, I shall mention
two facts from Dr Lear. The hand of a
man in good health was placed in a
basin of water at the temperature of
56°: - while his hand was

quiescent, the heat of the water rose to
65°. - that is 9°. ~~This~~ But when
he moved his hand & fingers in the
water it rose to 73 - that is 17°. Again.
he put this hand into a besom of water
at 57°. In this situation he filled
all its muscles by an act of his will,
without moving his hand. The water
rose in this case five Degrees beyond its temperature
at its quiescent state. Here we see heat
produced as in the pneumatic briquet
by simple pressure. Who after the result
of these experiments can suppose Animal
heat to be the effect of respiration only,
or the decomposition of air in the lungs?
It would seem from all the facts that

4 are ~~there~~ certain exercises of the
mind of a stimulating nature? we find
the heat of the body increased by them par-
=ticularly by anger, love, and terror.

have been mentioned, that a portion of animal heat like animal life is the product of stimuli, acting upon different parts of the body

Let us now inquire how far the theory I have delivered accords with the phaenomina of animal heat in the healthy & diseased body; and how it is applicable to the practice of physic — or the cure of diseases.

1st Is warm Air a Stimulus? we find the heat of the external parts of the body encreased by its action upon them

2 Are aliments & Drinks when taken into the stomach of a stimulating nature? we certainly observe the heat of the body to be encreased by them. This is most observable after a full meal.

3 Do sounds, light, and Odors stimulate the senses — ? we observe the heat of the body to be encreased by their action upon them.

V.